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| Sommario/riassunto | This book describes the remarkable connections that exist between the classical differential geometry of surfaces and modern soliton theory. The authors also explore the extensive body of literature from the nineteenth and early twentieth centuries by such eminent geometers as Bianchi, Darboux, Backlund, and Eisenhart on transformations of privileged classes of surfaces which leave key geometric properties unchanged. Prominent amongst these are Backlund-Darboux transformations with their remarkable associated nonlinear superposition principles and importance in soliton theory. It is with these transformations and the links they afford between the classical differential geometry of surfaces and the nonlinear equations of soliton theory that the present text is concerned. In this geometric context, solitonic equations arise out of the Gauß-Mainardi-Codazzi equations for various types of surfaces that admit invariance under Backlund-Darboux transformations. This text is appropriate for use at a higher undergraduate or graduate level for applied mathematicians or mathematical physics. |